

Droughts.—Droughts, injurious to vegetation, have been reported as follows: Connecticut, drought, lasting six weeks, ended on the 8th. Maine, Gardner, May and June both very dry; severe drought now prevails. Michigan, Northport, vegetation only partially recovered from the drought of May. North Carolina, Attaway, severe drought ended on the 9th. Vermont, West Charlotte, severe drought much relieved by rain of the 16th and 30th; hay crops will be one-third of the average. Florida, Pensacola, no rains for a month.

Hail-storms.—Hail storms have been reported as follows: 1st, Wis.; 2nd, Kan., Mt. Washington; 4th, Kan.; 5th, Neb., Pike's Peak; 6th, Kan., Neb.; 7th, Tenn., Ind.; 9th, Ill., Mo.; 10th, Dak., Mo., Pike's Peak; 11th, Ill., Ind., Kan., Mich., Dak.; 12th, Iowa, Dak., Mich.; 13th, Ind.; 14th, Neb., N. Y.; 15th, Iowa, Neb.; 16th, N. Y., Pike's Peak; 17th, Iowa; 18th, Pike's Peak; 19th, Iowa, Neb.; 20th, Ohio, Fla.; 22nd, Vt.; 23rd, Kan., Neb.; 24th, Neb.; 25th, Neb., Iowa, Ind.; 26th, Kan., N. C.; 28th, Nev., W. Va., (near Morgantown, breadth of storm one-half to three-quarters of a mile;) 29th, Minn., Wis., Neb., N. Y.; 30th, Ind., Neb., N. Y., Ohio, Wis.

Large Hail-stones.—30th, Genoa, Neb., diameter from half inch to 1 inch; 29th, Nilesville, Wis., diameter half inch, width of storm-track 10 miles; 25th, Dubuque, Iowa, large as quails' eggs; 11th, terrific hail, Leroy, Ill.; 30th, Fort Wayne, Ind., flat disks half inch diameter.

Snow fall.—At Summit, Col., the observer reports snow prevalent in first part of the month, and all traveling done on snow shoes. On Pike's Peak snow fell on the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 11th, 29th. On Mt. Washington sleet was reported on the 22nd.

Rainy Days.—The number of days on which rain has fallen, as recorded by Signal Service observers, ranges as follows: New England, 11 to 20 days; Middle Atlantic, 10 to 17; South Atlantic, 10 to 16; East Gulf, 9 to 13; West Gulf, 7 to 14; Tennessee and Ohio valley, 13 to 20; Lower Missouri, 15 to 22; Upper Mississippi, 11 to 19; Upper Lake region, 10 to 20; Lower Lake region, 14 to 20; Rocky Mountain stations, 5 to 7.

Cloudy Days.—The number of cloudy days reported during the month, by Voluntary Observers and Army Surgeons, ranges about as follows: New England, 7 to 15; Middle Atlantic States, 4 to 15; South Atlantic States, 6 to 12; East Gulf States, 8 to 18; West Gulf States, 0 to 8; Tennessee and Ohio valley, 7 to 14; Lower Missouri valley, 2 or 3; Upper Mississippi valley, 5 to 12; Lake region, 5 to 17.

RELATIVE HUMIDITY.

The average relative humidity for the month ranges about as follows: New England, 61 to 79; Middle Atlantic States, 67 to 84; South Atlantic States, 70 to 80; East Gulf States, 65 to 80; West Gulf States, 61 to 74; Tennessee and Ohio valley, 68 to 72; Lower Missouri valley, 68 to 71; Upper Mississippi valley, 64 to 71; Upper Lakes, 67 to 74; Lower Lakes, 65 to 74; San Francisco, 66. High stations, uncorrected for altitude, report as follows: Mount Washington, 83; Cheyenne, 38; Salt Lake City, 30; Santa Fe, 20; Pike's Peak, 76; North Platte, 54; Dodge City, 66; Virginia City, 44.

WINDS.

In General.—The prevailing winds at Signal Service stations are shown by arrows on chart No. II, from which it will be seen that, with scarcely an exception, south and southwest winds have been most numerous at all stations east of the Rocky Mountain slope. Northerly winds have prevailed in Oregon and California.

Total Movements.—The largest total movements are as follows: Breckenridge, 9, 205 miles; Cape Hatteras, 9,463; Cape Lookout, 10,378; Dodge City, 9,940; Indianola, 10,735; Kitty Hawk, 9,184; North Platte, 10,712; Pike's Peak, 18,894.

Smallest Movements.—Augusta, 2,418; Lynchburg, 2,446; Nashville, 2,891; Shreveport, 3,099.

Highest Velocities in miles per hour, have been: 6th, Dodge City, 60; — Indianola, 60; 18th and 25th, Indianapolis, 50; 25th, Chicago, 50; 19th, Mount Washington, 72; 22d, North Platte, 86; Pike's Peak, 87; 27th, Fort Whipple, 96.

Local Storms, Tornadoes, &c., have been reported as follows: unless specially noted, it is to be understood that the following list of high winds include only local storms, and not such gales as prevailed simultaneously over a large region. 4th, Mt. Carmel, Ill., and Mattoon, Ill., 5:45 p. m., track 1 mile long and 100 feet wide. 5th, waterspout in Elkhorn Valley, Neb.; terrific wind and rain, Charleston, Ill. 6th, Chambersburg, Pa., waterspout. 7th, peculiar hot, dry violent wind, Stockton, Cal. 9th, 5 miles north of Gainesville, Ga., heavy thunder-storm. 14th, Tornado at Rosemont, Dakota Co., and at Langdon, 12 miles

from St. Paul, Minn., about 8 p. m.; Northampton and Hadley, Mass. 17th, Memphis, tornado: this occurred within an area of high barometer, and of prevailing southerly winds, at 7 p. m. a huge black mass advanced northeastward from a bank of clouds, with a low rumbling sound, as it passed over Memphis intense darkness and terrific noise prevailed, the Signal Service observer, standing on the roof of his building, was undisturbed, while objects, 25 or 30 feet distant to the SE of him, were destroyed; the violent wind occupied 3 or 4 minutes in passing him, and was followed by torrents of rain; the width of the belt of destruction was 200 yards or less, and its track about a mile long, trending from SW to NE. 18th, Fort Wayne, Ind., tornado, unroofing buildings; Mount Auburn, Ohio. 20th, Plattsmouth, Neb., and Carthagena, Ohio. 21st, St. Joseph, Mo., tornado, also throughout eastern Penna. 22d, North Platte, terrific sand-storm, much damage; Brookhaven, Miss., severe local storm; New Ulm, Tx., tornado. 23d, Plattsmouth, Neb., tornado. 24th, Leavenworth, Kas., destructive storm. 25th, Elmira, Ill., destructive local storm; Merom, Ind., 5 p. m.; Fort Wayne, Ind., tornado from the SW, unroofing buildings. 26th, Denison, Texas, southerly gale, considerable damage; Fort Whipple, Va. 27th, Fort Gibson, destructive gale. 29th, New Ulm, Minn., violent local storm, and tornado 6 miles W of Minneapolis. 30th, tornado passed E of St. Louis, extraordinary hail-storm at Lafayette, Ind.; Vevay, Ind., remarkably violent thunder-storm; storms in Morgan, Johnson, Shelby, Decatur, Rush, Wayne and Henry Counties, Ind., also near St. Louis, Mo., Richmond, Ky., and the central portion of Ohio.

An especial investigation of the tornado of the 4th, at Mt. Carmel, Ill., has been made by the Signal Service, of which the following is a preliminary report: The first intimation of the approach of the tornado was the gathering of threatening clouds in the west about 4:30 p. m., portending a severe thunder-storm. Suddenly two heavy clouds, of a black or dark blue color above, and dun-color beneath or on the sides, apparently disconnected themselves from the general mass of clouds, one moving from the northwest and the other from the southwest, the two converging and forming a junction about two miles west of the town. From these two clouds the tornado, which first struck the earth about one and a half miles west of the town, in a heavy piece of timber, developed. After traveling about a mile through the woods and over several farms, sweeping away fences, trees and houses which lay in its track, which was at this time 60 to 75 yards in width, it made an upward leap and cleared the ground for nearly half a mile, descending again to the ground just west of the town. With a terrific crash and deafening roar a whirling column swept centrally through the town, its general course, being WSW to ENE. Its transit through the town, a distance of nearly three quarters of a mile, could not have occupied more than half a minute, and may have been less, while the duration of the destructive blast at any one given point, from many accounts rendered did not exceed eight or ten seconds. In a track about 125 yards in width the destruction was complete. Houses were not only leveled with the ground but in some instances were entirely blown away and trees were uprooted and hurled for long distances. From 75 to one hundred yards on either side of the main track the destruction of buildings, etc., was only partial, growing gradually less toward the outer edges. After passing through the town the tornado crossed the Wabash river and plunged into the dense forest on the Indiana side, where it continued its work of destruction for four or five miles, when it apparently spread out and dissipated.

On the 24th a tornado and water-spout passed from west to east about two and a half miles north of Fort Lyon, (Las Animas,) Col. It was seen to originate to the northeast of the fort, forming from a dense black cloud, which was seen to throw down and then retract a long arm almost to the earth several times in succession, about 4 p. m. Finally, at 5 p. m., there was seen a rapid rotary motion, confined to a heavy, dark cloud in the northwest, when there set in to the west of it a rapid whirl, carrying up from the earth a vast column of dust, which advanced from the west and formed a continuous column with the current in the cloud. Suddenly a water-spout formed in the centre of the whirl; it passed across the prairie with a terrific noise; hail of a very large size descended with the water in the centre of the whirl; the violent wind unroofed the railroad depot, demolished a switch-house, &c. The track as examined the next day appeared to be about 500 yards wide. Pieces of ice fell "so large that they could not be grasped in one hand."

The storms of the 25th merit special attention. The weather maps of the 23rd, 24th and 25th show that southerly winds prevailed, with high temperatures, from Texas northward to central Missouri and eastward over the Ohio valley; these were on the 24th deflected into southwest winds, with low barometer No. IX, to the westward. Numerous local rains were reported on the 24th in Missouri. Between 11:30 p. m. of the 24th and 12:30 a. m. of the 25th a small area of cool northerly winds descended south and southeastward through Nebraska and Iowa, accompanied by heavy rain, which was very severe at North Platte at midnight, and extended to Dodge City, Kan., where light rain prevailed from 11:30 p. m. to 11:50 p. m., and to Omaha, where it continued until 7:15 a. m. During the afternoon of the 25th an additional flow of air from the north over Iowa and Wisconsin re-enforced that from Nebraska, and on the 4:35 p. m. map a belt from Lake Michigan to Dubuque, and thence to the southwest corner of Iowa, divided the southwest winds, (temperature 72° to 83°,) from the north winds, (temperature 59° to 72°.) By 11 p. m. of the 25th

this dividing belt had been pushed up northward to northern Wisconsin, central Michigan and Lake Erie. Meanwhile a remarkable series of local storms had occurred over portions of Iowa, Missouri, Illinois, Indiana and Ohio, in the region of warm southeast to southwest winds. These local storms individually moved from southwest to northeast, while the recorded times of their occurrence show that they were successively generated farther and farther to the south and east. At 11 a. m. of the 25th, according to a special dispatch to the Associated Press, storms were prevailing as far east as Peoria and Springfield, Ill., as far south as Springfield, Ill., and as far north as Madison, Wis.; in Iowa the weather was generally clearing, except in the eastern border. By 12:30 or 1 p. m. numerous storms had prevailed over Illinois; between 1 and 4 p. m. they had overrun Illinois; between 3 and 7 p. m. they had overrun Ohio, the last record being 7 p. m., in Guernsey co. A second set of storms occurred after 9 or 10 p. m. over these same States.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-daily weather Indications with the telegraphic weather reports for the succeeding twenty-four hours, shows a general percentage of omissions of 0.25 per cent., and of verifications of 86.5 per cent. Out of 3,591 predictions, 2,582, or 71.9 per cent., have been fully verified; 362, or 19.1 per cent., have been three-fourths verified; 454, or 12.6 per cent., have been one-half verified; 96, or 2.7 per cent., have been one-fourth verified; 97, or 2.7 per cent., have failed. The percentage for the four elements have been: weather, 94.5; wind, 85.2; temperature, 86.5; barometer, 79.6. The percentages of verifications by geographical districts have been: New England, 84.6; Middle Atlantic States, 9.14; South Atlantic States, 83.1; East Gulf States, 89.2; West Gulf States, 90.1; Lower Lakes, 86.6; Upper Lakes, 82.0; Tennessee and the Ohio valley, 86.1; Upper Mississippi valley, 85.0; Lower Missouri valley, 85.1.

Cautionary Signals.—During the month 74 Cautionary Signals have been displayed at stations on the Gulf and Atlantic coasts and the Lakes. Of these 59, or 80 per cent., were justified by subsequent high winds within one hundred miles of the stations for which they were ordered, and 15, or 20 per cent., were not justified so far as known. Sixty one instances of high winds, when no signals were displayed, have also been reported from these stations. Telegraphic communication with the North Carolina coast-stations has continued interrupted during the month.

NAVIGATION.

Stages of Water.—In the table on chart No. III are given the highest and lowest readings on the river-gauges for the month. It will be seen that the Red river remained moderately high during the month at Shreveport, the water reaching its highest stage on the 23rd. The Cumberland reached its maximum height at Nashville on the 17th, and was generally low during the month. The Ohio was lowest from the 3rd to the 9th, after which several small freshet waves, the results of heavy showers, passed down; the most important of these was that which reached Cincinnati on the 23rd and Louisville on the 26th. The Mississippi continued moderately high during the month from Keokuk down, although the water did not rise to any dangerous heights. The nearest approach to the "danger-line" was at Vicksburg on the 1st; but the river fell slowly at this point until the 10th. Above Keokuk no important changes occurred, and the channel continued sufficiently deep for navigation. The Missouri has remained very high at most points during the entire month. At Corinth, Mo., on the 13th, the water was higher than it had been since July 5th, 1873, flats, lumber-yards and smelting-works were flooded, extinguishing the fires in the latter, without doing serious damage. 10th, overflows at Independence, Kan. 11th, overflows in the Elkhorn in Nebraska and the Arkansas at Little Rock.

Ice-bergs were reported on the 9th lat. 43° 44' N., long. 49° W.; on the 10th, lat. 43° 19' N., long. 48° 53' W.

TEMPERATURE OF WATER.

In General.—The temperature of water, as observed in rivers and harbors, is shown in the small table on chart No. II. The average temperatures have been lowest at Eastport, 39°; Marquette, 44.5. They have been highest at Augusta, 81°; Charleston, 78.5; Galveston, 78.5; Jacksonville, 77.5; Knoxville, 78; Mobile, 82.5; Montgomery, 81.5; Nashville, 78.5; St. Louis, 74.5; St. Marks, 77; Savannah, 78; Wilmington, 79.

Maximum and Minimum Temperatures.—The highest maxima have been: Jacksonville, 85°; Augusta, 86; Galveston, Mobile and Montgomery, 87. The lowest minima have been: Duluth, 45°; Marquette, 42; Eastport, 37.

Ranges of Temperature.—The least ranges have been: Eastport, 4°; Marquette, 5. The greatest ranges have been: Galveston, 17°; New London, 16; Jacksonville, 15; Omaha, St. Paul and Yankton, 14.